

### **Amendments to the Claims**

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

#### **Listing of Claims:**

Claim 1 (currently amended): ~~A method for locating objects by assembling~~producing a layout of objects within a space on a page, comprising:

generating a different tree structures each having at least one node and at least one leaf, wherein each node corresponds to a respective partition of the space and each leaf corresponds to defines a relative location of a respective one of the objects on the page;

for each of the tree structures, characterizing a respective bounding box for each node in the tree structure, wherein a each bounding box for each node includes all of the objects in any subtree below the respective node; and

for each of the tree structures, assigning regions within the space for each node in the tree structure in accordance with the respective bounding box associated with the node;

for each of the tree structures, determining a respective score that comprises a measure of available space on the page that is unoccupied by the objects arranged on the page in accordance with partitions of the page defined by the tree structure;

selecting one of the tree structures based on the determined scores; and

producing a layout of the objects on the page based on the selected tree structure.

Claim 2 (currently amended): The method of claim 1, wherein each object has a fixed aspect ratio and a relative area proportion associated therewith, and said characterizing comprises:

for each of the tree structures, establishing a relative area proportion and aspect ratio for each node as a function of relative area proportions and aspect ratios of children of the node.

Claim 3 (currently amended): A method for locating objects by assembling a layout of objects within a space, comprising:

generating a tree structure having at least one node and at least one leaf, where each leaf corresponds to one object;

characterizing a bounding box for each node in the tree structure, wherein a bounding box for each node includes all objects in any subtree below the node, each object has a fixed aspect ratio and a relative area proportion associated therewith, and said characterizing comprises

establishing a relative area proportion and aspect ratio for each node as a function of relative area proportions and aspect ratios of children of the node, and

~~The method of claim 2, wherein said characterizing further comprises adjusting~~  
relative area proportions of at least one child of each node and all children thereof so that predetermined dimensions of the children are equal,

performed prior to said establishing; and

assigning regions within the space for each node in the tree structure in accordance with the bounding box associated with the node.

Claim 4 (currently amended): The method of claim 2, wherein said establishing comprises for each of the tree structures:

determining right and left child relative area proportions and aspect ratios;  
determining performance metrics for left and right children and comparing those performance metrics; and

determining node relative area proportion and aspect ratio based on compared performance metrics and left and right child relative area proportions and aspect ratios.

Claim 5 (original): The method of claim 3, wherein said adjusting comprises:

determining right and left child relative area proportions and aspect ratios;

determining a factor for the node based on left and right child relative area proportions and aspect ratios; and

multiplying relative area proportions for one child and all its children by the factor.

Claim 6 (currently amended): The method of claim 1, further comprising iteratively performing the generating, the characterizing, the assigning, the determining, and the selecting for each of the different tree structures in sequence:

~~scoring the tree structure subsequent to said assigning;~~  
~~generating a different tree structure;~~  
~~performing said characterizing and assigning for each node in the different tree structure;~~  
~~scoring the different tree structure; and~~  
~~passing one of the tree structure and different tree structure having a higher score.~~

Claim 7 (original): The method of claim 1, further comprising reassigning objects to leaves within the tree structure after said characterizing and assigning, and repeating said characterizing and assigning for the reassigned objects.

Claim 8 (currently amended): A method ~~for assigning of~~ producing a layout of fixed aspect ratio objects on a page to a predefined space, comprising:

generating a binary tree structure comprising:

a plurality of leaves, wherein each ~~leaf of the leaves~~ corresponds to a respective one of the objects; and

~~at least one a plurality of nodes including a root node,~~ wherein each of the nodes corresponds to a respective partition of the page is associated with and represents all nodes and leaves branching therefrom;

~~defining a size appropriate bounding box for each of the nodes in the binary tree structure, determining a respective aspect ratio and a respective area of a respective, wherein the bounding box for each node defines a boundary for containing all bounding boxes respectively determined for all nodes and leaves branching therefrom from the node; and~~

~~locating producing a layout of the objects on the page in the predefined space by manipulating at least one size appropriate based on the bounding box determined for the root node to fit within the predefined space.~~

Claim 9 (currently amended): The method of claim 8, wherein each object has a relative area proportion associated therewith, and said ~~defining~~ determining comprises:

for each of the nodes in the binary tree structure, determining the respective area of the respective bounding boxes~~establishing a relative area proportion and aspect ratio for each node as a function of the relative area proportions and aspect ratios of the objects associated with children of the node.~~

Claim 10 (currently amended): The method of claim 9, wherein said ~~defining~~ determining further comprises adjusting the relative area proportion of each of the respective bounding boxes determined for proportions of at least one child of each of the nodes and all children thereof so that predetermined corresponding dimensions of the bounding boxes respectively determined for the children are equal,~~performed prior to said establishing.~~

Claim 11 (currently amended): The method of claim 9, wherein said ~~establishing~~ determining comprises:

determining right and left child relative area proportions and aspect ratios;  
determining performance metrics for left and right children and comparing those performance metrics; and

determining node relative area proportion and aspect ratio based on compared performance metrics and left and right child relative area proportions and aspect ratios.

Claim 12 (original): The method of claim 10, wherein said adjusting comprises:  
determining right and left child relative area proportions and aspect ratios;

determining a factor for the node based on left and right child relative area proportions and aspect ratios; and

multiplying relative area proportions for one child and all its children by the factor.

Claim 13 (original): The method of claim 8, further comprising:

scoring the binary tree structure subsequent to said locating;

generating a different binary tree structure;

performing said defining and locating for each node in the different binary tree structure;  
scoring the different binary tree structure; and  
passing one of the binary tree structure and different binary tree structure having a higher score.

Claim 14 (original): The method of claim 8, further comprising reassigning objects to leaves within the tree structure after said defining and locating, and repeating said defining and locating for the reassigned objects.

Claim 15 (currently amended): A method ~~for locating~~ of producing a layout of images in a predefined space on a page while maintaining aspect ratios associated with said images, the method comprising:

generating a binary tree structure comprising

a plurality of at least one nodes includes a root node, wherein each of the nodes corresponds to a respective partition of the predefined space on the page,  
and

a plurality of leaves, wherein each of the leaves corresponds leaf corresponding to  
ana respective one of the images and being is associated with a respective  
one of the nodes;

~~characterizing a bounding box for each of the nodes in the binary tree structure,~~  
determining a respective aspect ratio and a respective area of a respective ~~the~~ bounding box  
containing all bounding boxes respectively determined ~~establishing a boundary~~ for all leaves  
associated with the node; and

producing a layout of the images in ~~manipulating bounding boxes to fit within the~~  
predefined space on the page based on the bounding box determined for the root node.

Claim 16 (currently amended): The method of claim 15, wherein each image has a fixed aspect ratio and a relative area proportion associated therewith, and said ~~characterizing~~ determining comprises:

for each of the nodes in the binary tree structure, determining the respective area of the respective bounding box as a function of the relative area proportions of the objects associated with children of the node~~establishing a relative area proportion and aspect ratio for each node as a function of relative area proportions and aspect ratios of children of the node.~~

Claim 17 (currently amended): The method of claim 16, wherein said ~~characterizing~~ determining further comprises adjusting the relative area proportion of each of the respective bounding boxes determined for~~proportions of~~ at least one child of each node and all children thereof so that ~~predetermined~~ corresponding dimensions of the bounding boxes respectively determined for the children are equal, ~~performed prior to said establishing.~~

Claim 18 (currently amended): The method of claim 16, wherein said ~~establishing~~ determining comprises:

- determining right and left child relative area proportions and aspect ratios;
- determining performance metrics for left and right children and comparing those performance metrics; and
- determining node relative area proportion and aspect ratio based on compared performance metrics and left and right child relative area proportions and aspect ratios.

Claim 19 (original): The method of claim 17, wherein said adjusting comprises:

- determining right and left child relative area proportions and aspect ratios;
- determining a factor for the node based on left and right child relative area proportions and aspect ratios; and
- multiplying relative area proportions for one child and all its children by the factor.

Claim 20 (currently amended): The method of claim 15, further comprising:

- ~~scoring the binary tree structure subsequent to said manipulating;~~
- generating a different binary tree structure;
- performing said ~~characterizing and manipulating~~ determining for each node in the different binary tree structure; and

~~scoring the different~~assigning to each of the binary tree structures a respective score that comprises a measure of available space on the page that is unoccupied by the images arranged on the page in accordance with partitions of the page defined by the tree structure; and  
~~passing one of the binary tree structure and different binary tree structure having a higher score~~selecting one of the tree structures based on the determined scores.

Claim 21 (original): The method of claim 15, further comprising reassigning images to leaves within the binary tree structure after said characterizing and manipulating, and repeating said characterizing and manipulating for the reassigned images.